

**Bonneville Power Administration  
Fish and Wildlife Program FY99 Proposal**

**Section 1. General administrative information**

**Monitor Actions Implemented Under The Hood  
River Production Program.**

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**Bonneville project number, if an ongoing project** 8805304

**Business name of agency, institution or organization requesting funding**  
Oregon Department of Fish and Wildlife

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**Business acronym (if appropriate)** ODFW

**Proposal contact person or principal investigator:**

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**Subcontractors.**

<b>Organization</b>	<b>Mailing Address</b>	<b>City, ST Zip</b>	<b>Contact Name</b>
Confederated Tribes of the Warm Springs Reservation of Oregon	3430 West 10th	The Dalles, Oregon 97058	Mick Jennings (Contract #8805303)
Oregon Department of Fish and Wildlife	P.O. Box 15	Madras, Oregon 97741	Bill Nyara (Contract #9500700)
Confederated Tribes of the Warm Springs Reservation of Oregon	3430 West 10th	The Dalles, Oregon 97058	Mick Jennings (Contract #8802900)
Oregon Department of Fish and Wildlife	3701 West 13th	The Dalles, Oregon 97058	Jim Newton (Contract #9301900)

**NPPC Program Measure Number(s) which this project addresses.**

7.4L.1, 7.4L.2, 7.4N.1, 7.4N.2

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**NMFS Biological Opinion Number(s) which this project addresses.**

**Other planning document references.**

Columbia River Intertribal Fish Commission. 1996. Wy-Kan-Ush-Mi Wa-Kish-Wit. Spirit of the salmon. The Columbia River anadromous fish restoration plan of the Nez Perce Umatilla, Warm Springs, and Yakama tribes. Portland, Oregon, Volume II:25-26

**Subbasin.**

Hood River

**Short description.**

Monitor and evaluate actions taken to re-establish spring chinook salmon, and improve natural production of summer and winter steelhead, in the Hood River subbasin. Data will be used to develop, and refine, management objectives for the HRPP.

**Section 2. Key words**

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction		Watershed
	Resident fish		O & M		Biodiversity/genetics
	Wildlife		Production	X	Population dynamics
	Oceans/estuaries		Research		Ecosystems
	Climate	X	Monitoring/eval.		Flow/survival
	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

**Other keywords.**

Production, Escapements, Life history

**Section 3. Relationships to other Bonneville projects**

Project #	Project title/description	Nature of relationship
9301900	Hood River Production Program (Parkdale & Oak Springs) - O&M	Project #88-053-04 samples jack and adult anadromous salmonids at an adult migrant trap operated at a hatchery facility located in the mainstem of the Hood River at Powerdale dam. The O&M of this facility is funded under this contract.

9500700	Hood River Production Program - PGE O&M	O&M for the hatchery spring chinook salmon production program in the Hood River subbasin is funded under this contract. Project #88-053-04 evaluates several activities implemented under this contract.
8805303	Hood River Production Program - CTWS - M&E	Hatchery acclimation facilities and the CTWS component of the M&E program of the HRPP are funded under this contract. Activities of this contract and project #88-053-04 need to be coordinated to effectively implement the entire M&E program for the HRPP.
8802900	Hood River Production Program - Pelton Ladder - Hatchery	Hatchery spring chinook salmon are reared in Pelton ladder prior to release in the Hood River subbasin. This contract funds the O&M for this facility. Project #88-053-04 evaluates several activities implemented under this contract.

## Section 4. Objectives, tasks and schedules

### *Objectives and tasks*

Obj 1,2,3	Objective	Task a,b,c	Task
1	Determine abundance of downstream migrant anadromous salmonids leaving the Hood River subbasin	a	Estimate numbers of downstream migrant wild steelhead and spring chinook salmon smolts and hatchery summer and winter steelhead smolts leaving the Hood River subbasin.
1		b	Estimate relative abundance of non-supplemented species of downstream migrant salmonids leaving the Hood River subbasin.
2	Determine abundance of upstream migrant jack and adult anadromous salmonids in the Hood River subbasin.	a	Enumerate and count all species of migratory salmonids and trout (i.e., bull and cutthroat trout) escaping to Powerdale Dam.
2		b	Estimate, by brood year, escapement of natural and hatchery

			produced spring chinook salmon and summer and winter steelhead to Powerdale Dam.
3	Determine selected life history patterns for juvenile anadromous salmonids in the Hood River subbasin	a	Estimate age structure of downstream migrant wild rainbow/steelhead.
3		b	Estimate temporal distribution of downstream migrant steelhead smolts.
3		c	Estimate selected morphometric characteristics of downstream migrant wild steelhead: including mean fork length and condition factor.
3		d	Estimate selected morphometric characteristics of downstream migrant spring chinook salmon, coho salmon, migratory bull trout, and cutthroat trout; including mean fork length and condition factor.
4	Determine selected life history patterns for jack and adult anadromous salmonids in the Hood River subbasin.	a	Estimate age structure for Hood River stocks of natural and subbasin hatchery produced jack and adult migratory anadromous salmonids.
4		b	Estimate the temporal distribution of migration to the Hood River subbasin for Hood River stocks of migratory anadromous salmonids.
4		c	Estimate selected morphometric characteristics for Hood River stocks of natural and subbasin hatchery produced migratory anadromous salmonids: including mean fork length and mean weight.
4		d	Estimate morphometric characteristics for Hood River stocks of natural and subbasin hatchery produced migratory anadromous salmonids: including mean fecundity and sex ratios.
5	Determine harvest and catch contribution of wild and	a	Estimate harvest of hatchery summer and winter steelhead

	hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon.		below Powerdale Dam.
5		b	Estimate harvest of natural and hatchery spring chinook salmon below Powerdale Dam.
5		c	Collect scale samples from summer and winter steelhead and spring chinook salmon harvested below Powerdale Dam.
5		d	Estimate age structure of hatchery summer and winter steelhead and natural and hatchery spring chinook salmon harvested below Powerdale Dam.
6	Determine selected life history patterns of jack and adult anadromous salmonids harvested in the Hood River subbasin.	a	Collect coded wire tags from harvested marked anadromous salmonids.
6		b	Estimate mean fork length and sex ratio for harvested summer and winter steelhead and spring chinook salmon.
6		c	Estimate age structure, mean fork length, and sex ratio, by age class, for harvested summer and winter steelhead and spring chinook salmon.
6		d	Summarize coded wire tags recovered from summer and winter steelhead and spring chinook salmon.
7	Identify populations of wild cutthroat and rainbow trout and wild summer and winter steelhead in the Hood River subbasin.	a	Analyze tissue and fin samples collected from rainbow and cutthroat trout and summer and winter steelhead sampled in the Hood River subbasin.
8	Continue review and coordination of work required to implement the HRPP.	a	Review and comment on drafts of product deliverables prepared by other HRPP participants.
8		b	Coordinate with other inter- and intra- agency activities which effect ODFW's research

			component of HRPP.
8		c	Prepare an annual report summarizing biological data collected by ODFW's research component of HRPP.

***Objective schedules and costs***

<b>Objective #</b>	<b>Start Date mm/yyyy</b>	<b>End Date mm/yyyy</b>	<b>Cost %</b>
1	3/1999		25.91%
2	10/1998		6.82%
3	3/1999		8.16%
4	10/1998		6.82%
5	10/1998		18.06%
6	10/1998		6.01%
7	10/1998		16.01%
8	10/1998		12.21%
			<b>TOTAL 100.00%</b>

**Schedule constraints.**

No constraints are anticipated that would cause a schedule change.

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**Completion date.**

Ongoing

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## **Section 5. Budget**

***FY99 budget by line item***

<b>Item</b>	<b>Note</b>	<b>FY99</b>
Personnel		\$166,224
Fringe benefits		\$66,489
Supplies, materials, non-expendable property		\$36,650
Operations & maintenance		
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		
PIT tags	# of tags:	
Travel		\$8,280
Indirect costs		\$63,581
Subcontracts		\$60,000

Other	Capital (replacement cones for downstream migrant traps)	\$11,000
<b>TOTAL</b>		\$412,224

### ***Outyear costs***

<b>Outyear costs</b>	<b>FY2000</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>
Total budget	\$424,000	\$437,000	\$450,000	\$462,000
O&M as % of total	0.00%	0.00%	0.00%	0.00%

## **Section 6. Abstract**

A monitoring and evaluation (M&E) project was implemented in December 1991 to collect life history and production information on stocks of anadromous salmonids returning to the Hood River subbasin. This information is being used to evaluate various activities of the Hood River Production Program (HRPP) and to develop management guidelines that will minimize the HRPP's impact on indigenous populations of fish. ODFW funded the project until July 1992, after which time funding was provided by the BPA (Project #88-053-04). Jack and adult escapements and selected jack and adult life history patterns, and meristic and morphometric characteristics, have been estimated for six complete run years of winter steelhead, spring and fall chinook salmon, and coho salmon and five complete run years of summer steelhead. Subbasin jack and adult anadromous salmonid harvest and exploitation rates have been estimated for two calendar years. Rainbow-steelhead rearing densities, mean fork length, mean weight, and condition factor have been estimated for four years in selected reaches of stream located throughout the Hood River subbasin. Estimates of subbasin steelhead smolt production and data on selected types of steelhead smolt life history, meristic, and morphometric characteristics, has been collected for four years. Estimates of in-basin hatchery summer and winter steelhead smolt mortality have also been estimated for four years. Information collected by this project has been used to 1) determine the current status of indigenous populations of resident and anadromous salmonids, 2) identify measures that will minimize any potentially detrimental impacts the HRPP could have on indigenous populations of resident trout and anadromous salmonids, and 3) develop and fine tune management guidelines that will optimize the benefits associated with the HRPP.

## **Section 7. Project description**

### **a. Technical and/or scientific background.**

The Northwest Power Planning Council approved the Hood River and Pelton ladder master plans in 1992. The program implemented in the Hood River subbasin was initially called the Hood River Production Program (HRPP) and had two primary goals: 1) to increase subbasin production of wild summer and winter steelhead and 2) re-

establish spring chinook salmon in the subbasin. The ODFW began funding a monitoring program in December 1991 and continued funding the program through July 1992. The monitoring program provided stock specific estimates of wild, natural, and hatchery produced anadromous salmonids escaping to an adult migrant trap located in the mainstem Hood River at Powerdale dam (RM 4.5). The ODFW's monitoring program also collected corresponding information on selected life history patterns and morphometric and meristic characteristics. BPA began funding the monitoring and evaluation component of the HRPP in August of 1992 and has funded this project annually through September 1998 (i.e., FY 98).

Current and previous contracts have funded work which has provided stock specific empirical data on resident trout and wild, natural and hatchery produced anadromous salmonids in the Hood River subbasin (Olsen et al. 1994, Olsen et al. 1995, Olsen et al. 1996, and Olsen and French 1998). Annual progress reports document information collected on 1) juvenile rearing densities, 2) subbasin smolt production, 3) the percentage of acclimated and direct released hatchery summer and winter steelhead smolts that leave the subbasin from a given production release, 4) wild and hatchery smolt to adult survival rates (i.e., preliminary estimates), 5) jack and adult escapements and harvest, 6) spatial distribution of adult holding, 7) life history patterns, and 8) selected morphological and meristic characteristics. This quantitative data has been used to more accurately define 1) the spatial distribution of spawning and rearing populations of anadromous salmonids; 2) the current status of indigenous populations of wild summer and winter steelhead; 3) potential impacts the historical subbasin hatchery program may have had on indigenous populations of fish; 4) the current status of available anadromous salmonid habitat in the subbasin; 5) smolt to adult survival (i.e., preliminary estimates); and 6) the in-basin post-release survival of hatchery summer and winter steelhead production releases.

Information has been used extensively to refine our approach to implementing the Hood River Production Program in a manner that will minimize the program's impact on indigenous populations of fish. In particular, data has been used to 1) determine the most suitable areas for releasing hatchery smolts into the subbasin, 2) develop criteria for collecting hatchery broodstock, 3) develop guidelines for implementing the hatchery supplementation program, and 4) refine our approach to releasing acclimated hatchery smolts into the subbasin. Data showing critically low estimates of wild summer and winter steelhead escapements, and subbasin steelhead smolt production, also indicate the need to implement this program in a timely manner. Data collected on streamflows in the East Fork of the Hood River indicate the need to take a more proactive approach towards enforcing existing water rights with the goal of providing a greater degree of protection for indigenous populations of fish.

This project has collected, summarized, and documented over the past five years a significant amount of stock specific information on juvenile and adult anadromous salmonids in the Hood River subbasin. While this information has been critical in implementing the HRPP in a biologically sound manner, the data set is still incomplete. The multiplicity of juvenile and adult steelhead life history patterns requires a data set collected over a much longer time frame to achieve this projects objectives.

The 1993 brood is the first brood in which an estimate of subbasin wild steelhead production can be made for all age classes of downstream migrant smolts and returning adults. This is based on the fact that 1994 is the first year in which we estimated subbasin steelhead smolt production. Wild steelhead from the 1993 brood will migrate as freshwater age 1, 2, 3, and 4 smolts in 1994, 1995, 1996, and 1997, respectively. Then, depending on the freshwater age they migrate as smolts, adult steelhead will return as 1-, 2-, 3-, and 4-salt adults during the 1994-95 through 2001-02 run years. This complex life history pattern essentially precludes our ability to develop our first estimate of smolt to adult survival of wild steelhead until FY 2002. A similar situation also exists with evaluating the acclimation facilities. Complete brood returns from the first release of acclimated hatchery winter steelhead smolts (1995 brood) will not be available until completion of the 1999-2000 run year (FY 2000). The first release of acclimated hatchery summer steelhead smolts (1998 brood) will not occur until the spring of 1999. Complete brood returns from this production release will not be available until completion of the 2003-04 run year (FY 2004). Determining a statistically significant difference in survival rates would require estimates of smolt to adult survival for at least three to five brood releases of acclimated hatchery fish. This means that we would not be able to evaluate any changes in survival rate until at least FY 2002 for hatchery winter steelhead and FY 2006 for hatchery summer steelhead.

A long term data set will also be required when we try to evaluate changes in subbasin smolt production and any impact the HRPP might have on indigenous populations of fish. The hatchery winter steelhead program was the first component of the HRPP to be implemented in the Hood River subbasin and, consequently, will be the first program that we will be able to evaluate. Hatchery winter steelhead smolts were first released as part of the HRPP in the spring of 1995 (1994 brood). The very first year in which a noticeable impact on subbasin smolt production might be anticipated from this brood release will not occur until the spring of 1999. Freshwater age 2 smolts migrating in the spring of 1999 would have the potential for being progeny of 1994 brood age 1.2 (freshwater.ocean age) hatchery adult winter steelhead that spawned in the Hood River subbasin in 1997. Detecting a statistically significant increase in subbasin smolt production would require that we estimate subbasin smolt production for an additional 2-4 years which means that we would not be able to determine if the HRPP has improved subbasin steelhead smolt production until FY 2001 at the earliest. Also, any changes in life history patterns and morphometric and meristic characteristics probably could not be statistically detected for juvenile steelhead until FY 2001 and for adult steelhead until FY 2005.

The Hood River subbasin is a very biologically complex system by virtue of the fact that the subbasin supports populations of virtually all species of resident trout and anadromous salmonids. They include wild populations of rainbow, cutthroat, and bull trout and summer and winter steelhead and natural populations of spring and fall chinook salmon and coho salmon. Juvenile and adult life history patterns are typically more complex for steelhead but resident trout and salmon also exhibit a diversity of patterns, although significantly fewer combinations may occur as is the case with coho salmon.

This inherent biological diversity precludes a short term monitoring and evaluation project that can be used to evaluate the HRPP's hatchery supplementation program and its impact on indigenous populations of fish. Achieving the objectives stated in **Section 7b** below will require a long term commitment in terms of both dollars and personnel.

**b. Proposal objectives.**

**Objective 1.** Determine abundance of downstream migrant anadromous salmonids leaving the Hood River subbasin.

Null Hypothesis 1: Implementation of the HRPP has not significantly increased wild steelhead smolt production in the Hood River subbasin.

Alternative: Implementation of the HRPP has significantly increased wild steelhead smolt production in the Hood River subbasin.

Null Hypothesis 2: Implementation of the HRPP has not successfully re-introduced a naturally producing population of spring chinook salmon in the Hood River subbasin.

Alternative: Implementation of the HRPP has successfully re-introduced a naturally producing population of spring chinook salmon in the Hood River subbasin.

Null Hypothesis 3: Hatchery acclimation facilities has not significantly increased numbers of hatchery smolts leaving the Hood River subbasin.

Alternative: Hatchery acclimation facilities has significantly increased numbers of hatchery smolts leaving the Hood River subbasin.

We propose conducting a mark and recapture program at a downstream juvenile migrant trap located near RM 4.5 in the mainstem of the Hood River. The program will be used to estimate numbers of wild steelhead and salmon smolts and hatchery summer and winter steelhead smolts leaving the Hood River subbasin. Data will be used to ascertain current wild steelhead and salmon smolt production and to determine if the HRPP is successful in 1) increasing subbasin wild steelhead smolt production and 2) re-introducing a naturally producing population of spring chinook salmon. Data will also be used to determine if acclimation facilities significantly increase the numbers of hatchery smolts leaving the Hood River subbasin and, in conjunction with estimates of escapement (*see Objective 2*) and harvest (*see Objective 5*), will be used to determine if acclimation facilities significantly increase hatchery smolt to adult survival rates. Estimates will be summarized annually in a research progress report. Ancillary life history, morphometric, and meristic data collected at the migrant trap will also be summarized in the annual progress report (*see Objective 3*).

**Objective 2.** Determine abundance of upstream migrant jack and adult anadromous salmonids in the Hood River subbasin.

Null Hypothesis 1: Summer and winter steelhead and spring chinook salmon subbasin escapement goals have not been achieved subsequent to implementation of the HRPP.

Alternative: Summer and winter steelhead and spring chinook salmon subbasin escapement goals have been achieved subsequent to implementation of the HRPP.

Null Hypothesis 2: Summer and winter steelhead and spring chinook salmon spawner escapement goals have not been achieved subsequent to implementation of the HRPP.

Alternative: Summer and winter steelhead and spring chinook salmon spawner escapement goals have been achieved subsequent to implementation of the HRPP.

We propose counting upstream migrant jack and adult anadromous salmonids at an adult migrant trap located in the mainstem Hood River at Powerdale Dam (RM 4.5). Data will be used to ascertain current escapements of wild and hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon and to determine if the HRPP's subbasin and spawner escapement goals are being achieved (*see Objective 5*). Estimates will be summarized annually in a research progress report. Ancillary life history, morphometric, and meristic data collected at the adult migrant trap will also be summarized in the annual progress report (*see Objective 4*).

**Objective 3.** Determine selected life history patterns for juvenile anadromous salmonids in the Hood River subbasin.

Null Hypothesis 1: Implementation of the HRPP has significantly altered the life history patterns of indigenous populations of anadromous salmonids in the Hood River subbasin.

Alternative: Implementation of the HRPP has not significantly altered the life history patterns of indigenous populations of anadromous salmonids in the Hood River subbasin.

Null Hypothesis 2: Implementation of the HRPP has significantly altered the morphometric and meristic characteristics of indigenous populations of anadromous salmonids in the Hood River subbasin.

Alternative: Implementation of the HRPP has significantly altered the morphometric and meristic characteristics of indigenous populations of anadromous salmonids in the Hood River subbasin.

We propose sampling downstream migrant rainbow-steelhead and salmon at a juvenile migrant trap located near RM 4.5 in the mainstem of the Hood River. Data will be collected on juvenile migration timing, age structure, mean fork length (mm), and condition factor. Information will be used to determine if any of the selected parameters are changing subsequent to implementation of the HRPP and to what extent changes may be due to implementation of the hatchery supplementation component of the HRPP. Data will be summarized annually in a research progress report.

**Objective 4.** Determine selected life history patterns for jack and adult anadromous salmonids escaping to the Hood River subbasin.

Null Hypothesis 1: Implementation of the HRPP has significantly altered the life history patterns of indigenous populations of anadromous salmonids in the Hood River subbasin.

Alternative: Implementation of the HRPP has not significantly altered the life history patterns of indigenous populations of anadromous salmonids in the Hood River subbasin.

Null Hypothesis 2: Implementation of the HRPP has significantly altered the morphometric and meristic characteristics of indigenous populations of anadromous salmonids in the Hood River subbasin.

Alternative: Implementation of the HRPP has significantly altered the morphometric and meristic characteristics of indigenous populations of anadromous salmonids in the Hood River subbasin.

We propose sampling upstream migrant jack and adult anadromous salmonids at an adult migrant trap located in the mainstem of the Hood River at Powerdale Dam (RM 4.5). Data will be collected on jack and adult migration timing, age structure, mean fork length (mm), fecundity (i.e., wild and hatchery produced summer and winter steelhead and natural and hatchery spring chinook salmon used as hatchery broodstock), and sex ratio. Information will be used to determine if any of the selected parameters are changing subsequent to implementation of the HRPP and to what extent changes may be due to implementation of the hatchery supplementation component of the HRPP. Data will be summarized annually in a research progress report.

**Objective 5.** Determine harvest and catch contribution of wild and hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon.

Null Hypothesis 1: Summer and winter steelhead and spring chinook salmon subbasin harvest goals have not been achieved subsequent to implementation of the HRPP.

Alternative: Summer and winter steelhead and spring chinook salmon subbasin harvest goals have been achieved subsequent to implementation of the HRPP.

We propose conducting a creel program below Powerdale Dam to estimate harvest of wild and hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon in the Hood River subbasin. Data will primarily be used to determine if the HRPP's harvest goal's are being achieved but will also be used, in conjunction with estimates of escapement at Powerdale Dam, to determine if the HRPP's subbasin escapement goals are being achieved (*see Objective 2*). Harvest goal's have not been established at this time but will be developed jointly by the Oregon Department of Fish and Wildlife and the Confederated Tribes of the Warm Springs Indians upon full implementation of the HRPP. Data will be summarized annually in a research progress report.

**Objective 6.** Determine selected life history patterns of jack and adult anadromous salmonids harvested in the Hood River subbasin.

Null Hypothesis 1: Subbasin fisheries are selectively modifying life history patterns of wild and hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon.

Alternative: Subbasin fisheries are not selectively modifying life history patterns of wild and hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon.

Null Hypothesis 2: Subbasin fisheries are selectively modifying the morphometric and meristic characteristics of wild and hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon.

Alternative: Subbasin fisheries are not selectively modifying the morphometric and meristic characteristics of wild and hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon.

We propose sampling jack and adult anadromous salmonids harvested in fisheries located in the mainstem Hood River below Powerdale Dam (RM 4.5). Data will be collected on the temporal distribution of harvest, age structure, mean fork length (mm), and sex ratio. Estimates obtained from the fishery will be compared to estimates obtained at Powerdale Dam (*see Objective 4*) to determine if the fishery is selectively harvesting jack and adult fish from unique components of the wild, natural, and hatchery runs. Selectively harvesting fish from unique components of the wild, natural, and hatchery runs has the potential for altering either the genetic diversity or genetic composition of indigenous populations of anadromous salmonids. Data will be summarized annually in a research progress report.

**Objective 7.** Describe the population structure, including subspecies identity, population structure within subspecies, and potential and extent of hybrid zones between species of wild cutthroat (*O. clarki*) and resident and anadromous *O. mykiss*.

Null Hypothesis 1: Both species are independent, entirely reproductively isolated breeding units.

Alternative: Some level of hybridization is occurring between *O. clarki* and *O. mykiss*.

Null Hypothesis 2: The Hood River subbasin is occupied only by coastal subspecies of the two species (*O.m. irideus* and *O.c. clarki*)

Alternative: Inland subspecies (*O.m. gairdneri* and *O.c. lewisi*) or some undescribed subspecies are at least partly present.

Null Hypothesis 3: Each species is a completely homogenized, randomly breeding group. There are no population structure or isolated gene pools within subspecies of *O. mykiss* and *O. clarki* in the Hood River subbasin.

Alternative: There are isolated gene pools within subspecies of *O. mykiss* and *O. clarki* in the Hood River subbasin.

Null Hypothesis 4: Past hatchery programs for *O. mykiss* have not resulted in inter-breeding between hatchery and wild populations in the subbasin.

Alternative: Past hatchery programs for *O. mykiss* have resulted in inter-breeding between hatchery and wild populations in the subbasin.

The proper management of wild fish species requires a good understanding of the population structure and pattern of biodiversity present in the system. This is a particularly critical if a management action may modify or manipulate the structure of that system. The management activity most likely to modify population structure is artificial propagation. Hatchery programs have the unique capacity to modify the fitness of individuals and gene flow between populations with serious consequences.

This study provides important baseline information about *O. mykiss* and *O. clarki* population structure and the possible influence of past hatchery practices that is important for good management in the Hood River subbasin. As a consequence of this study the population structure of the two species in this subbasin will be clarified. The Hood River subbasin is located in a geographical area of great complexity for these species. The subbasin is on the boundary of two subspecies of *O. mykiss* (inland and coastal) and on the periphery of the *O. clarki* subspecies (coastal). Both conditions can contribute to exceptional patterns of diversity. Hatchery broodstocks from both *O. mykiss* subspecies have been used in the subbasin, along with an *O. clarki* stock from elsewhere in the subspecies distribution. Further, it has become apparent that the two species hybridize in the subbasin and in adjacent areas.

This study will investigate aspects of the biodiversity of *O. mykiss* and *O. clarki* within the Hood River subbasin, but also from adjacent subbasins from the Willamette to the Deschutes. Isolated sampling in the Hood River subbasin alone would not be meaningful. Samples from adjacent subbasins are necessary in order to put the complex genetic variation observed within the Hood River subbasin into proper context across a wider distribution of the species.

Genetic samples were collected from wild and hatchery summer and winter steelhead and from resident rainbow and cutthroat trout from 1994-96. A small number of the samples have been analyzed to date. We propose completing the analysis in FY 99. Data will be summarized and analyzed in a completion report.

**Objective 8.** Continue review and coordination of work required to implement the HRPP.

Null Hypothesis 1: None.

Alternative: None

This proposed monitoring and evaluation (M&E) project is one component of a comprehensive program (i.e., HRPP) designed to improve runs of wild summer and winter steelhead and re-introduce spring chinook salmon in the Hood River subbasin. Active coordination with other program participants is required to effectively evaluate the HRPP. This objective primarily addresses activities required to efficiently integrate all the HRPP program related activities with this project's M&E activities. The final product deliverable is the annual progress report summarizing data collected during FY 99.

**c. Rationale and significance to Regional Programs.**

In 1992, the Northwest Power Planning Council approved the Hood River and Pelton ladder master plans (O'Toole and Oregon Department of Fish and Wildlife 1991a, O'Toole and Oregon Department of Fish and Wildlife 1991b, and Smith and The Confederated Tribes of the Warm Springs Reservation of Oregon 1991) within the framework of the Columbia River Basin Fish and Wildlife Program. The master plans define an approach for implementing a hatchery supplementation program in the Hood River subbasin.

The primary goals of the HRPP are 1) to increase production of wild summer and winter steelhead (*Oncorhynchus mykiss*) and 2) to reintroduce spring chinook salmon (*Oncorhynchus tshawytscha*) into the Hood River subbasin. Harvest and escapement goals are identified in O'Toole and Oregon Department of Fish and Wildlife (1991a), O'Toole and Oregon Department of Fish and Wildlife (1991b), and Smith and The confederated Tribes of the Warm Springs Reservation of Oregon (1991). Strategies for achieving the production goals were initially devised based on various assumptions about subbasin carrying capacity, smolt to adult survival rates, and current escapements of anadromous salmonids to the Hood River subbasin. To obtain the information needed to more accurately estimate each parameter this project proposes operating an adult migrant trap at Powerdale Dam to collect life history and escapement information on jack and adult anadromous salmonids escaping to the Hood River subbasin. This project also proposes operating several juvenile downstream migrant traps to collect life history and subbasin smolt production estimates for wild steelhead and salmon and to collect information on in-basin post-release survival of hatchery summer and winter steelhead smolts and hatchery spring chinook salmon smolts. Information collected at the adult and juvenile migrant traps will be used to 1) refine the wild, natural, and hatchery production goal's of the HRPP using subbasin and stock specific empirical data; 2) evaluate acclimation facilities operated under Contract Number 89-053-03; 3) develop guidelines for implementing the hatchery supplementation project implemented under Contract Numbers 93-019, 95-070, and 88-29; 4) evaluate the Pelton ladder rearing facilities operated under Contract Number 88-29; 5) develop guidelines for implementing the hatchery supplementation program in a manner that will minimize the HRPP's impact on indigenous populations of resident and anadromous salmonids; and 6) develop and refine strategies for implementing the HRPP in a manner that will improve efficiency and programmatic benefits.

**d. Project history**

A monitoring and evaluation (M&E) project was implemented in the Hood River subbasin beginning in December 1991 to collect life history and production information

on stocks of anadromous salmonids returning to the Hood River subbasin. ODFW funded the project until July of 1992, after which time funding was provided by BPA (Contract Number 88-053-04). This contract has been reauthorized, and fully funded, by BPA through FY 98.

Data collected from the initial M&E program was used to provide some of the basic baseline jack and adult life history and escapement information needed to 1) evaluate various management options for implementing the proposed HRPP and 2) determine any post-project impacts the proposed HRPP might have on indigenous populations of resident fish. Information was also used in the preparation of an environmental impact statement (EIS; Bonneville Power Administration 1996a; Bonneville Power Administration 1996b) which was completed in 1997. The Bonneville Power Administration (BPA) prepared the EIS in compliance with federal guidelines established in the National Environmental Policy Act (NEPA).

Jack and adult anadromous salmonid escapements and selected life history patterns and meristic and morphometric characteristics have been estimated on six complete run years of winter steelhead, spring and fall chinook salmon, and coho salmon and five complete run years of summer steelhead. Subbasin jack and adult anadromous salmonid harvest and exploitation rates have been estimated for two calendar years. Rainbow-steelhead and cutthroat trout rearing densities, mean fork length, mean weight, and condition factor have been estimated for four years in selected reaches of stream located throughout the Hood River subbasin. Downstream migrant wild rainbow-steelhead have been sampled for four years to estimate subbasin steelhead smolt production and selected life history patterns and meristic and morphometric characteristics. Estimates of in-basin hatchery summer and winter steelhead smolt mortality have also been estimated for four years.

Data collected on this project has been summarized annually in the following progress reports: Olsen et al. 1994, Olsen et al. 1995, Olsen et al. 1996, and Olsen and French 1998. Information collected by this project will be used to 1) determine the current status of indigenous populations of resident and anadromous salmonids, 2) identify measures that will minimize any potentially detrimental impacts the HRPP might have on indigenous populations of resident trout and anadromous salmonids, and 3) develop and fine tune management guidelines that will optimize the benefits associated with the HRPP.

#### **e. Methods.**

##### **Objective 1.**

Downstream migrant rainbow-steelhead (rb-st) and hatchery summer and winter steelhead smolts will be trapped at a rotary-screw trap located at approximately RM 4.5 in the mainstem Hood River. The screw traps will be sampled on a daily basis. Sampling will be conducted primarily in the morning to reduce temperature related

stress. Migrants will be anesthetized, examined for marks, and counted. Counts of downstream migrant rainbow-steelhead (rb-st) will be made for two size categories; they will include fish greater than or equal to 150 mm fork length and fish less than 150 mm fork length. This separation into two size categories will be made because data indicates the smaller size category is predominately comprised of age 0 migrants which are not considered to be smolts (Olsen et al. 1998). A random sample of juveniles, collected from both size categories, will be measured to the nearest millimeter fork length, weighed to the nearest 0.1 gram, and have a sample of scales taken for purposes of aging the juveniles. Data will be recorded on computerized data entry forms and keypunched into a computer database. Scale samples will be transferred to glass slides and read by trained personnel located at ODFW's research lab in Corvallis.

Downstream migrant rb-st trapped at the screw trap will be used to indirectly estimate steelhead smolt migration timing and production because no accurate methodology exists to visually identify rainbow trout from downstream migrant steelhead smolts. A mark and recapture methodology will be used to estimate numbers of migrant rb-st passing the migrant trap. Downstream migrants will be marked with a panjet needleless injector. The panjet will be used to shoot a narrow high speed stream of colored dye at selected fins. This process will be used to mark the fin with a unique color code by infusing a small amount of colored dye below the epidermal layer. The dye color and marked fin combination will be changed every two weeks to uniquely mark fish at defined time intervals throughout the period of smolt migration.

A pooled Petersen estimate with Chapman's modification will be used to estimate numbers of downstream migrants, by size category (*see* Olsen et al. 1998). Approximate 95% confidence intervals will be calculated according to methods described in Olsen et al. (1998).

Data will be summarized to provide estimates of 1) subbasin wild steelhead smolt production and 2) numbers of hatchery summer and winter steelhead smolts leaving the subbasin. Summaries will be formatted both by brood year and year of sampling. Data will be summarized in an annual progress report.

Constraints: We have effectively operated downstream migrant screw traps from 1994-97 to estimate numbers of downstream migrant wild rainbow-steelhead and hatchery summer and winter steelhead smolts. With the exception of estimates made in 1995, the 95% confidence limits have ranged from plus or minus 30-50% of the estimate. The primary constraint limiting our ability to achieve this objective is associated with the highly variable streamflows occurring in the Hood River subbasin. Our ability to accurately estimate downstream migrants is highly dependent upon the severity, and periodicity, of storms encountered in the Hood River subbasin.

## **Objective 2.**

Upstream migrant wild, natural, and hatchery produced jack and adult anadromous salmonids will be trapped at an adult migrant trap located in the mainstem Hood River at Powerdale Dam (RM 4.5). The trapping facility will be operated daily, to weekly, throughout the year. The trap will be checked in the morning to minimize potential handling stress associated with sampling fish during the afternoon when water temperatures are typically higher. Spring and fall races of chinook salmon will be distinguished based on run timing, external coloration, and general appearance. Summer and winter races of steelhead will be distinguished based on fin marks, external coloration, degree of scale tightness and scale erosion, state of sexual maturity relative to the time of year, external parasite load, color of gill filaments, and general appearance.

All jack and adult salmonids trapped at the migrant facility will be anesthetized with CO<sub>2</sub>, classified by sex, and examined for hatchery mark combinations and injuries. Injuries will be categorized as either a predator scar, net mark, hook scar, or scrape. Predator scars will include both closed and open wounds. A closed wound is typically identified as an “M” shaped marine mammal scar where scales are missing and the skin is scratched. An open wound is identified as one in which the skin is broken. Net marks are distinguished by a raw, rubbed mark on the leading edge of the dorsal fin. Generally, marks from the net twine can be seen encircling the fish. Hook scars include both fresh and healed wounds. Fresh hook scars are any wound in the area of the mouth in which the skin is torn or abraded. Healed hook scars are identified by a missing maxillary or deformed jaw.

A random sample of wild, natural, and hatchery produced jack and adult salmonids will be weighed to the nearest kg, measured to the nearest centimeter fork length, and have a sample of scales taken to age the fish. Fecundity will also be estimated for wild and hatchery produced summer and winter steelhead and natural and hatchery produced spring chinook salmon that are collected at Powerdale Dam for hatchery broodstock. Data will be recorded on computerized data entry forms and keypunched into a computer database. Jack and adult scale samples will be transferred to gummed cards and sent to ODFW’s research lab in Corvallis where an acetate impression will be made of each card and they will be read by trained personnel. All jack and adult fish collected at the adult migrant trap will be floy tagged prior to release. Floy tags will allow the capability of identifying recaptures at the adult migrant trap.

Data will be summarized to provide stock specific estimates of the number of wild, natural, and hatchery produced jack and adult salmonids escaping to Powerdale Dam. Data will be formatted to provide summaries by both brood year and run year. Data will be summarized in an annual progress report.

Constraints: The adult trapping facility at Powerdale Dam has been successfully operated since December 1991. We do not anticipate any constraints limiting our ability to achieve the stated objective.

### **Objective 3.**

Selected juvenile life history patterns and morphometric and meristic characteristics will be characterized for wild, natural, and hatchery produced migrants sampled at a juvenile migrant trap located in the mainstem Hood River. Sampling methodologies are outlined under **Objective 1.**

Data collected at the juvenile migrant trap will be summarized to provide estimates of mean fork length, mean weight, and condition factor for downstream migrant 1) wild rainbow-steelhead, 2) naturally produced chinook and coho salmon, and 3) hatchery produced summer and winter steelhead. Data will be formatted to provide summaries by both brood year and run year. Migration timing of wild downstream migrants will also be characterized by age category and for the sample population. Data will be summarized in an annual progress report.

Constraints: We have effectively operated downstream migrant screw traps from 1994-97. Highly variable streamflows in the Hood River subbasin could limit our ability to obtain adequate sample sizes to accurately estimate specific parameters but we do not anticipate any constraints limiting our ability to satisfactorily achieve the stated objective.

### **Objective 4.**

Selected jack and adult life history patterns and morphometric and meristic characteristics will be characterized for wild, natural, and hatchery produced anadromous salmonids sampled at an adult migrant trap located in the mainstem Hood River at Powerdale Dam (RM 4.5). Sampling methodologies are outlined under **Objective 2.**

Data will be summarized to provide stock specific estimates of sex ratio, mean fork length, mean weight, and fecundity (e.g. for summer and winter steelhead and spring chinook salmon) for wild, natural, and hatchery produced jack and adult anadromous salmonids sampled at Powerdale Dam. Data will be formatted to provide summaries by both brood year and run year. Stock specific estimates of the temporal distribution of migration will also be estimated for wild, natural, and hatchery components of the run. Data will be summarized in an annual progress report.

Constraints: The adult trapping facility at Powerdale Dam has been successfully operated since December 1991. We do not anticipate any constraints limiting our ability to achieve the stated objective.

### **Objective 5.**

Creel surveys will be conducted on the Hood River from 1 January through 31 December. The survey area will extend from the mouth of the Hood River to the

reach of stream which can be visually observed from atop Powerdale Dam (approximately RM 4.7). The creel will be limited to this reach of stream because punch card returns indicate the greater percentage of fish (approximately 75% or more) are harvested in this area and because our ability to accurately estimate harvest above Powerdale dam is limited both by the diversity of access points and the low numbers of anglers which fish above the dam. Access to the survey area below Powerdale dam is primarily limited to three main sites.

Two levels of stratification (day type and two week period) will be used in summarizing the data, and estimates of catch, catch rate, and effort will be determined for both strata. Sampling days will be categorized as either a weekend-holiday or week day and total catch will be summarized by two week periods (bi-monthly) that will encompass the first through the fifteenth and the sixteenth through the end of each month.

Hours of effort for each sample day will be estimated by developing a pressure curve from periodic pressure counts and calculating area under the curve. The first and last pressure counts will be considered as zero points and will be assumed to be ½ hour before sunrise and ½ hour after sunset. Pressure counts will be conducted three times during the day. Times will be determined by dividing the sampling day into three equal length periods and conducting a pressure count at the point when angler numbers appear to be the highest during the period. The direction of surveyor travel for the first pressure count will be randomly selected. Subsequent pressure counts will be made in the opposite direction of the previous count. Anglers will be interviewed throughout the day to obtain catch rate information on both fishers that had completed angling as well as for those that had not completed angling.

Estimates of total catch and variance in the estimate of total catch, for a given category of fish (i.e., hatchery summer or winter steelhead, hatchery spring chinook salmon, etc.) , will be determined by summing the corresponding stratum estimates. Calculations for estimating harvest and 95% C.L. are presented in Olsen and French (1998).

All harvested jack and adult salmonids will be classified by sex and examined for hatchery mark combinations. Spring and fall races of chinook salmon will be distinguished based on run timing, external coloration, and general appearance. Summer and winter races of steelhead will be distinguished based on hatchery mark combination, external coloration, degree of scale tightness and scale erosion, state of sexual maturity relative to the time of year, external parasite load, color of gill filaments, and general appearance.

A random sample of wild, natural, and hatchery produced jack and adult salmonids will be measured to the nearest centimeter fork length and have a sample of scales taken to age the fish. Snouts will also be collected from fish having a fin mark indicating they have been coded wire tagged. Data will be recorded on computerized

data entry forms and keypunched into a computer database. Jack and adult scale samples will be transferred to gummed cards and sent to ODFW's research lab in Corvallis where an acetate impression will be made of each card and they will be read by trained personnel.

Data will be summarized to provide species and race specific estimates of harvest for wild, natural, and hatchery produced jack and adult anadromous salmonids harvested in the fishery located below Powerdale dam. Data will be formatted to provide summaries by both brood year and run year. Data will be summarized in an annual progress report.

Constraints: We have successfully estimated harvest in both 1996 and 1997. We do not anticipate any constraints limiting our ability to achieve the stated objective.

#### **Objective 6.**

Selected jack and adult life history patterns and morphometric and meristic characteristics will be characterized for wild, natural, and hatchery produced anadromous salmonids harvested in fisheries located below Powerdale Dam (RM 4.5). Sampling methodologies are outlined under **Objective 5**.

Data will be summarized to provide stock specific estimates of sex ratio and mean fork length for wild, natural, and hatchery produced jack and adult anadromous salmonids harvested in the fishery located below Powerdale dam. Data will be formatted to provide summaries by both brood year and run year. Stock specific estimates of the temporal distribution of harvest will also be estimated for wild, natural, and hatchery produced components of the run. Data will be summarized in an annual progress report.

Constraints: We have successfully implemented the creel program in both 1996 and 1997. We do not anticipate any constraints limiting our ability to satisfactorily achieve the stated objective.

#### **Objective 7.**

Population structure within these unique systems, along with the influence of past hatchery practices on this structure, will be investigated by comparing genetic variation within and between populations within each species. The genetic markers that are being selected for this part of the study will distinguish differences between populations by differences in frequency levels. Because of the subspecies boundary in the area of the Hood River subbasin, a further focus will be on the use of markers that can distinguish, to a nearly diagnostic level, between the subspecies. And finally, it is apparent that hybridization between *O. mykiss* and *O. clarki* is far more prevalent than expected. Among other implications of this pattern is the potential of hatchery impacts due to interbreeding across species boundaries. Therefore markers are also

being selected according to their ability to diagnostically distinguish between the two species and, thereby, clearly identify hybrid zones.

The pattern of natural variation in Hood River *O. mykiss* and *O. clarki*, as well as the potential influence hatchery practices may have on this pattern, will be investigated using micro-satellite DNA markers. Micro-satellite DNA, which is nuclear DNA, can be extracted and amplified, either from whole fish or from any tissue samples that contain nucleated cells. DNA markers range from highly conserved (differences may be evident only between species or even higher taxa) to highly variable (differences occur between individuals). Different markers can, therefore, be selected depending on the questions under investigation.

In this study, whole fish, or fish tissue samples, have been collected from populations throughout the Hood River subbasin as well as from adjacent subbasins and from all *O. mykiss* and *O. clarki* hatchery stocks that have been planted in the Hood River subbasin.

The lab analysis is being conducted by Fred Allendorf's lab at the University of Montana.

Constraints: The primary constraint in the completion of this study, as it was originally designed, is the extraordinary and unexpected level of hybridization between the two study species. It is currently unclear whether these events are entirely natural, or whether some management activity or subbasin condition may be contributing to the events. A further implication of hybridization is that hatchery programs for either species could potentially impact the other. The resolution of this issue may require that additional samples be collected.

## **Objective 8.**

This M&E project is designed to 1) evaluate selected activities implemented under several contracts funded by the BPA and 2) collect the empirical stock specific biological data needed by fishery managers to implement the HRPP in the most cost effective, efficient, and biologically sound manner. The ability to collect the needed information, and to submit product deliverables in a timely manner, requires the close integration of this project's M&E activities with a complexity of other actions taken in the subbasin to improve wild and natural production of anadromous salmonids; actions which include not only those specific to the HRPP but also include the actions of other project's implemented by both the public and private sector. The tasks associated with this objective provide for the basic administrative structure needed to ensure that this project 1) is effectively coordinated with other subbasin activities designed to improve wild and natural production of anadromous salmonids, 2) provides the biological information needed to implement the HRPP in the most cost efficient and biologically sound manner, and 3) delivers the stated contract deliverables (*see Objectives 1-7*).

**f. Facilities and equipment.**

This project is currently being operated out of a field station located in The Dalles, Oregon. The field station provides an office, conference room, lobby, large shop, storage area, and parking. The shop is supplied with the machine tools required to repair the downstream migrant traps and other field equipment used by this project. This project has four vehicles (i.e., 4x4 pickup, Suburban, and Jeep) which are parked at the field station. All major office supplies and field equipment, needed to implement this project, have been purchased under previous contracts. Major office supplies include three computers and associated software, FAX machine, copier, laserjet printer, and several desks and filing cabinets. Major field equipment includes: five downstream migrant traps, drift boat, one flow meter, three panjet needless dye injectors, capstan winch, freezer, three microscopes, two balances, and assorted tools. We do not anticipate the need to purchase any high-cost equipment in FY 99 other than replacement cones for several of the downstream migrant traps.

The downstream migrant traps are presently stored at the HRPP's hatchery facility located at Powerdale dam. The operation and maintenance of the facility is currently funded by BPA under the project entitled Hood River Production Program (Parkdale & Oak Springs) - O&M (Contract Number 93-019-00). The adult migrant trap is also located at this facility and the continued operation and maintenance of this facility is required to collect the information needed to achieve **Objectives 2 and 4** identified in **Section 7b**.

**g. References.**

Bonneville Power Administration. 1996a. Draft environmental impact statement. Bonneville Power Administration (Contract DOE/EIS 0241), Portland, Oregon.

Bonneville Power Administration. 1996b. Final environmental impact statement (DOE/EIS 0241). Bonneville Power Administration (Contract DOE/EIS 0241), Portland, Oregon.

Columbia River Intertribal Fish Commission. 1996. Wy-Kan-Ush-Mi Wa-Kish-Wit. Spirit of the salmon. The Columbia River anadromous fish restoration plan of the Nez Perce Umatilla, Warm Springs, and Yakama tribes. Portland, Oregon, Volume II: 25-26

Olsen, E.A., R.A. French, and J.A. Newton. 1994. Hood River and pelton ladder evaluation studies. Annual Progress Report of Confederated Tribes of the Warm Springs Reservation and Oregon Department of Fish and Wildlife (Project Numbers 89-29, 89-29-01, 89-053-03, 89-053-04, and 93-019; Contract Numbers DE-BI79-

89BP00631, DE-BI79-89BP00632, DE-BI79-93BP81756, DE-BI79-93BP81758, DE-BI79-93BP99921) to Bonneville Power Administration, Portland, Oregon.

Olsen, E.A., R.A. French, and A.D. Ritchey. 1995. Hood River and pelton ladder evaluation studies. Annual Progress Report of Oregon Department of Fish and Wildlife and Confederated Tribes of the Warm Springs Reservation (Project Numbers 88-29, 89-29-01, 89-053-03, 89-053-04, and 93-019; Contract Numbers DE-BI79-89BP00631, DE-BI79-89BP00632, DE-BI79 93BP81756, DE-BI79-93BP81758, DE-BI79 93BP99921) to Bonneville Power Administration, Portland, Oregon.

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Olsen, E.A. and R.A. French. 1998. Hood River and pelton ladder evaluation studies. Annual Progress Report of Oregon Department of Fish and Wildlife (Project Numbers 88-29, 89-29-01, 88-053-03, 88-053-04, and 93-019; Contract Numbers DE-BI79-89BP00631, DE-BI79-89BP00632, DE-BI79-93BP81756, DE-BI79-93BP81758, DE-BI79-93BP99921) to Bonneville Power Administration, Portland, Oregon.

Oregon Department of Fish and Wildlife and Confederated Tribes of the Warm Springs Reservation of Oregon. 1990. Hood River subbasin salmon and steelhead production plan. Columbia Basin System Planning Report to Northwest Power Planning Council, Portland, Oregon.

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O'Toole, P. and Oregon Department of Fish and Wildlife. 1991a. Hood River production master plan. Final Report of the Confederated Tribes of the Warm Springs Reservation and the Oregon Department of Fish and Wildlife (Project 88-053, Contract DE-BI79-89BP00631) to Bonneville Power Administration, Portland, Oregon.

O'Toole, P. and Oregon Department of Fish and Wildlife. 1991b. Hood River production master plan (Appendices). Final Report of the Confederated Tribes of the Warm Springs Reservation and the Oregon Department of Fish and Wildlife

(Project 88-053, Contract DE-BI79-89BP00631) to Bonneville Power Administration, Portland, Oregon.

Smith, M. and Confederated Tribes of the Warm Springs Reservation of Oregon. 1991. Pelton ladder master plan. Final Report of the Oregon Department of Fish and Wildlife and the Confederated Tribes of the Warm Springs Reservation (Project 89-029, Contract DE-BI79-89BP01930) to Bonneville Power Administration, Portland, Oregon.

## **Section 8. Relationships to other projects**

The HRPP is composed of five separate contracts that could impact the program if one or more contracts are not fully funded according to schedule. The five contracts primarily provide funding for three broad categories of activities. These include engineering, implementation, and monitoring and evaluation studies. Funding for the engineering component of the HRPP provides for the design and construction of facilities at Powerdale Dam, Parkdale, and Oak Springs Hatchery that are required to fully implement the HRPP. Funding for implementation provides for broodstock collection, holding and spawning, rearing, and marking and tagging. Funding for monitoring and evaluation studies provides for the evaluation of the HRPP and any interaction the hatchery program may be having on wild populations of fish. Inadequate, or loss of, funding for any component will jeopardize our ability to achieve project goals according to the time frame established in the EIS. This is particularly crucial for construction work proposed for FY 97. The proposed adult holding and acclimation facilities at Parkdale are required to begin implementing the summer steelhead and spring chinook salmon programs. Completion of hatchery facilities at Oak Springs Hatchery also needs to coincide with completion of the Parkdale facilities before we can begin implementing the summer steelhead program. The winter steelhead program could be implemented without the Parkdale facilities but at a much lower level than proposed for full implementation of the HRPP. The HRPP also relies heavily on the close cooperation of the USFS, PacifiCorp, CTWS, ODFW, Hood River Watershed Council, Farmers Irrigation District, East Fork Irrigation District, Middle Fork Irrigation District, and Longview Fiber. These various entities have supported project goals by way of 1) facilitating or allowing access to public and private lands, 2) providing consent to develop facilities on private lands, and 3) assisting in the implementation of project related tasks. Continued cooperation among these entities is crucial to achieving project goals.

This project is located in the same office as The Fifteenmile Creek Habitat Improvement Project (Fifteenmile Creek project; Project # 93-040; Contract # 95BI60772). Combining the two project's into one field office has allowed us to significantly lower the annual cost's associated with the implementation of this M&E project. The primary savings are achieved by having ready access to equipment and machine tools that would be exceedingly expensive to buy, but which are needed on a periodic basis throughout the year. The Fifteenmile Creek project owns or leases virtually all the machine tools needed

to maintain and repair our field equipment, and also provides our project staff with the expertise of personnel trained in the operation and maintenance of the machine tools. Additionally, the general expenses associated with maintaining the field office and shop are equally shared with the Fifteenmile Creek project, which also helps to significantly reduce the overhead associated with this project.

## **Section 9. Key personnel**

### **Program Leader (Chip Dale; FTE 0.17)**

#### Education

1986 Colorado State University, Fort Collins, CO.  
Degree: MS in Wildlife Biology  
1977 Colorado State University, Fort Collins, CO.  
Degree: BS in Wildlife Biology

#### Training

AFS Habitat Workshop, Bellevue, WA. 1991  
State of Oregon DAS Core Curriculum for Managers and Supervisors.  
USFS GAWS Aquatic Habitat Inventory.

#### Experience

1993 – Present

Oregon Department of Fish and Wildlife Assistant Regional Supervisor (Fisheries).  
Administer the fisheries resources of the High Desert Region of ODFW.  
Programs include research, habitat, Fisheries, and Propagation. Administer  
Programs involving ~60 FTE's and ~\$3.5 million dollar budget.

1983-1990

Denver Water Department, Environmental Planner.  
Responsible for planning and implementation of habitat restoration projects  
for mitigation for mitigation of impacts related to dam construction. Also  
oversaw inventory programs conducted jointly with Colorado Division of  
Wildlife to measure fish population abundance in impacted reaches of rivers  
affected by Denver Water District's operations.

#### Reports authored or co-authored

Dale, A. R. and J. A. Bailey. 1982. Application of optimal foraging theory for  
bighorn sheep habitat analysis. Proc. 3<sup>rd</sup> Bienn. Symp. North Wild Sheep  
and Goat Counc. Pp 254-264.  
Chilcote, M., K. Kostow, H. Weeks, H. Schaller, and A. Dale. 1991. First  
Biennial Report on Status of Oregon's Wild Fish Populations. ODFW.

### **Project Leader (Erik Olsen; Hood River/Pelton ladder project; FTE 1.0)**

#### Education

1970-1974 Portland State University, Portland, Oregon  
Major: Biology  
1974-1976 Oregon State University, Corvallis, Oregon  
Degree: B.S. in Fisheries Science

## Experience

12/92-Present

### Oregon Department of Fish and Wildlife

Project leader on the Hood River/Pelton ladder project (Project No. 88-053-04). Primary responsibilities include: 1) project administration, 2) preparation of a research sampling plan to evaluate the HRPP and to collect information on the life history and biology of anadromous and resident salmonids in the Hood River subbasin, 3) summarizing and analyzing project data, and 4) preparation of annual progress reports and statements of work. Experience gained in 1) the development and maintenance of databases, 2) development of software to summarize data using both FORTRAN and Fox Pro programming languages, and 3) the life history and biology of anadromous salmonids.

06/90-11/92

### Oregon Department of Fish and Wildlife

Project leader on the Coordinated Information System (Project No. 88-108; Contract No. DE-FC79-89BP94402). Primary responsibilities included: 1) project administration, 2) preparation of a standardized reporting format for reporting information on the life history and biology of anadromous salmonids in Oregon subbasins to the Columbia River basin, 3) preparation of a report, summarizing in a standardized format, all available information on the life history and biology of anadromous salmonids in Oregon subbasins to the Columbia River Basin, and 4) preparation of quarterly reports and statements of work. Experience gained in 1) the presentation and summarization of complex biological data, 2) development and maintenance of databases, 3) development of software to summarize data using FORTRAN, Dbase, and Fox Pro programming languages, 4) the life history and biology of stocks of anadromous salmonids located throughout the Columbia River Basin, and 5) issues pertaining to the management of stocks of anadromous salmonids in the Columbia River Basin.

## Reports authored or co-authored

Lindsay, R.B., W.J. Knox, M.W. Flesher, B.J. Smith, E.A. Olsen, and L.S. Lutz. 1986. Study of wild spring chinook salmon in the John Day River system. Final Report of Oregon Department of Fish and Wildlife (Project No. 79-4; Contract No. DE-A179-83BP39796) to Bonneville Power Administration, Portland, Oregon.

Olsen, E.A., R.A. French, and J.A. Newton. 1994. Hood River and pelton ladder evaluation studies. Annual Progress Report of Confederated Tribes of the Warm Springs Reservation and Oregon Department of Fish and Wildlife (Project Numbers 89-29, 89-29-01, 89-053-03, 89-053-04, and 93-019; Contract Numbers DE-BI79-89BP00631, DE-BI79-89BP00632, DE-BI79-93BP81756, DE-BI79-93BP81758, DE-BI79-93BP99921) to Bonneville Power Administration, Portland, Oregon.

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**Assistant Project Leader** (Rod French; Hood River/Pelton ladder project; FTE 1.0)

Education

1986 Oregon State University, Corvallis, Oregon

Degree: B.S. in Fisheries Science

Experience

12/92-Present

Oregon Department of Fish and Wildlife

Assistant project leader on the Hood River/Pelton ladder project (Project No. 88-053-04). Primary responsibilities include: 1) the implementation of project field work, 2) assisting the project leader in the preparation of a research sampling plan for the HRPP and to collect information on the life history and biology of anadromous and resident salmonids in the Hood River subbasin, 3) summarizing and analyzing project data, 4) the purchase of field equipment, 5) the coordination of field work with other project cooperators, 6) assisting the project leader in the preparation of annual progress reports and statements of work, and 7) giving presentations on project results and findings. Experience gained in 1) the use of downstream migrant screw traps, 2) the use of adult trapping facilities, and 3) the life history and biology of anadromous salmonids.

06/92-11/92

Oregon Department of Fish and Wildlife

Assistant project leader on the Umatilla Hatchery Monitoring and Evaluation Project. Primary responsibilities include 1) the implementation of project tasks designed to collect information on water chemistry; life history and biology of anadromous salmonids; and harvest, 2) the summarization and analysis of project data, 3) assisting the project leader in preparation of annual progress report, and 4) giving presentations at professional society meetings.

01/88-05/92

Oregon Department of Fish and Wildlife

Fisheries Biologist 1 on the Native Trout Research Project. Primary responsibilities include assisting project leader in the collection of data on native trout in Klamath, Harney and Deschutes river subbasins. Data was collected on 1) migration timing, 2) numbers of downstream migrants, temporal and spatial distribution of spawning, 3) life history and biology of resident salmonids, and 4) relative resistance of trout to specific pathogens. Assisted with preparation of monthly and annual reports and with the preparation of publications for scientific journals. Prepared and presented presentations for professional societies and sportsman's groups.

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- Olsen, E.A., R.A. French, and J.A. Newton. 1994. Hood River and pelton ladder evaluation studies. Annual Progress Report of Confederated Tribes of the Warm Springs Reservation and Oregon Department of Fish and Wildlife (Project Numbers 89-29, 89-29-01, 89-053-03, 89-053-04, and 93-019; Contract Numbers DE-BI79-89BP00631, DE-BI79-89BP00632, DE-BI79-93BP81756, DE-BI79-93BP81758, DE-BI79-93BP99921) to Bonneville Power Administration, Portland, Oregon.
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- Olsen, E.A. and R.A. French. 1998. Hood River and pelton ladder evaluation studies. Annual Progress Report of Oregon Department of Fish And

Wildlife (Project Numbers 88-29, 89-29-01, 89-053-03, 89-053-04, and 93-019; Contract Numbers DE-BI79-89BP00631, DE-BI79-89BP00632, DE-BI79-93BP81756, DE-BI79-93BP81758, DE-BI79-93BP99921) to Bonneville Power Administration, Portland, Oregon.

## **Section 10. Information/technology transfer**

Data collected from this project will be summarized in an annual progress report and distributed to fishery managers. Project personnel will present information to local watershed council's and sport's groups; other participant's working on the HRPP; the NPPC, CBFWA, and BPA; and ODFW staff.